



Memorandum

*To: Jennifer LaPoma, EPA Region 2
Elizabeth Franklin, USACE*

*From: Yeqing Liu, CDM Smith
Keegan L. Roberts, Ph.D., PE, CDM Smith*

Date: September 11, 2017

*Subject: Summary of Oversight of Cap Inspection at River Mile 10.9
August 21–22, 2017
Lower Passaic River Restoration Project*

On behalf of the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE), Kansas City District, CDM Federal Programs Corporation (CDM Smith) traveled to the River Mile (RM) 10.9 removal area on August 21 and 22, 2017 and provided field technical oversight for the annual visual inspection of the cap. Probing/poling was conducted along 12 transects across the cap at 10 to 30 foot intervals to confirm the presence of the armor layer and measure the depth to the armor layer from either the sediment surface (assessed by foot on August 21, 2017) or from the water surface (assessed by boat on August 22, 2017). AECOM did not measure depth from the water surface to top of the soft sediment at locations that were probed by boat because they were unable to differentiate soft sediment from the water column with their probing/poling techniques. Armor layer thicknesses were not assessed during the inspection.

Transects A through J were perpendicular to the shore with these ten transects intercepting the 2016 SPME sampler stations. The other two transects (X and Y) were located at the upstream and downstream ends of the cap and were also perpendicular to the shore. When possible, depth to the habitat sand layer overlying the armor layer was also measured at each probing/poling location, if it could be differentiated from the surface sediment with the utilized probing/poling methods. Field activities were conducted by AECOM on behalf of the Cooperating Parties Group (CPG).

The transects are presented in Figure 1. The poling points displayed in Figure 1 are from the July 6-7, 2016 cap inspection. GPS coordinates of the August 21-22, 2017 cap inspection poling points have not yet been received from the CPG as of the date of this memorandum. Photographs of field activities are presented in Attachment 1. A copy of the field logbook notes is provided in Attachment 2.

Summary of August 21, 2017 Field Activities

Personnel in Attendance

Yeqing Liu – CDM Smith
Claire Murphy-Higgin – AECOM
Helen Jones – AECOM

AECOM began the cap inspection on foot at 13:55 with a single 2-person team probing/poling along transects during low tide. Two to four locations were probed along each of Transects C, D, E, B, A, X, F, G, and H (in chronological order). The number of probing/poling points along each transect was determined by how accessible each transect was. Accessibility was determined as the ability to reach an unsubmerged measurement location by foot without sediment reaching above the calves of the AECOM field staff. Transects I, J, and Y were not reached as they were inaccessible by foot from the shore.

At each transect, the first measurement was located at approximately the start of the armor layer next to the shore. Locations were probed/poled with a 4-foot piece of steel rebar. Every six-inch interval on the steel rebar was marked with either blue or red tape. However, sediment sludge on the steel rebar quickly obscured the blue and red tape so alternatively, depth was measured with a folding ruler along the steel rebar after pulling the rebar out of the sediment. Depth to armor layer from sediment surface was measured at each location and the GPS coordinates of each location were also recorded. If the sand layer was detected as a distinct layer from the overlying sediment, depth to sand was also recorded. Transects and SPME sampling locations are presented on Figure 1 of this document, and the aforementioned depth measurements are presented in Table 1 below.

At two locations (E-3 and G-1), significant variations in depth to armor layer were observed. As a result, 36 locations were further probed along a 3 ft by 3 ft grid (with 6 inches between each measurement) at both E-3 and G-1. The locations within the first grid were labeled "AG-1" through "AG-36" and were centered around E-3 (close to the 0605 sampler station along Transect E). The locations within the second grid were labeled "BG-1" through "BG-36" and were centered around G-1 (close to the 0607 sampler station along Transect G). The depth measurements from the grids AG and BG are presented in Tables 2 and 3, respectively, below. The GPS coordinates of each individual point within the grids were not recorded due to lack of necessary GPS precision for the grid points, but the general GPS location of each grid was recorded. Diagram 1 provides a conceptual schematic of the grid AG layout (grid BG was laid out similarly).

Diagram 1: AG grid layout

AG-1 ●	AG-2 ●	AG-3 ●	AG-4 ●	AG-5 ●	AG-6 ●
AG-12 ●	AG-11 ●	AG-10 ●	AG-9 ●	AG-8 ●	AG-7 ●
AG-13 ●	AG-14 ●	AG-15 ●	AG-16 ●	AG-17 ●	AG-18 ●
AG-24 ●	AG-23 ●	AG-22 ●	AG-21 ●	AG-20 ●	AG-19 ●
AG-25 ●	AG-26 ●	AG-27 ●	AG-28 ●	AG-29 ●	AG-30 ●
AG-36 ●	AG-35 ●	AG-34 ●	AG-33 ●	AG-32 ●	AG-31 ●

At certain locations along the transects (F-1, F-4, and G-1) and within the grids (AG-7, -8, -13, -17, -18, -20, -24, -28, -33, -35, BG-14, and BG-25), depth to geotextile fabric was measured instead of depth to armor layer due to absence of the armor layer. In certain locations, armor layer stone was felt along the sides of the steel rebar when it reached the geotextile fabric and AECOM noted that the steel rebar was likely wedged between armor layer stones. At F-1, F-4, and G-1, transect locations where armor layer was absent, further probing was conducted and the armor layer was detected within 6 inches of the absent area. Depth to armor layer was then recorded at the nearby location. When armor was not detected at G-1, five locations in the vicinity of missing armor (Armor-1 through Armor 5) were probed to determine the extent of the missing armor. These were not labeled as additional points along Transect G because they were probed around G-1. Armor layer was determined to be present at these five locations and AECOM recorded depth to armor layer and GPS coordinates for each (Table 1).

At SPME sampler stations 0606, 0607, and 0608 (along Transects F, G, and H, respectively), the metal rod with steel plate used to identify the sampler station for future sampling events was observed (See Photographs 6 and 7).

Large fallen branches were noted lying on sediment in the vicinity of Transect E but did not appear to puncture the cap (See Photograph 1).

The probed/poled depth to armor layer and thickness of sediment above the cap are summarized below in Table 1. When “depth to the sand layer” was measured, the measured value was considered the thickness of the sediment layer above the sand. When “depth to sand layer” was not measured, AECOM indicated they were unable to clearly differentiate between sediment and sand.

Table 1: August 21, 2017 Cap Inspection Summary

Time	Transect	Location	Thickness of Sediment Layer Above the Cap (in)	Thickness of Sand Layer (in)	Depth to Armor Layer (in)	Comment
14:05	C	C-1	N/A	---	0.5	Landward edge of armor layer
14:06	C	C-2	N/A	---	2.5	---
14:08	C	C-3	7	3.5	10.5	---
14:11	C	C-4	13	8.5	21.5	---
14:20	D	D-1	N/A	---	10	Landward edge of armor layer
14:22	D	D-2	13.25	3.25	16.5	
14:24	D	D-3	N/A	---	14.25	---
14:32	E	E-1	N/A	---	3	Landward edge of armor layer
14:35	E	E-2	12	6.5	18.5	---
14:38	E	E-3	11.75	10.25	22	Vicinity of 0605 sampling station, felt variability in depth through probing/poling. Grid sampling conducted in vicinity (AG-1 through AG-36) to explore the variability.
14:44	E	AG Grid	Varies	Varies	Varies	See Table 2 AG Grid Measurement below
15:30	B	B-1	11	3.75	14.75	Landward edge of armor layer
15:34	B	B-2	10	2	12	---
15:35	B	B-3	17.5	3	20.5	---
15:39	A	A-1	7.5	6	13.5	---
15:40	A	A-2	6.25	2.5	8.75	---
15:42	A	A-3	9	1.5	10.5	Vicinity of 0601 sampling station
15:45	X	X-1	N/A	---	5.74	---
15:47	X	X-2	N/A	---	ND	No armor (off-cap)
15:48	X	X-3	N/A	---	9	---

Time	Transect	Location	Thickness of Sediment Layer Above the Cap (in)	Thickness of Sand Layer (in)	Depth to Armor Layer (in)	Comment
15:49	X	X-4	N/A	---	14.25	---
16:00	F	F-1	2.25	---	ND	No armor layer detected, geotextile fabric at 18 inches. However, armor stones were felt on the sides of the steel rebar. 6 inches away, the armor layer was detected at 1 inch below surface.
16:06	F	F-2	4	3.25	7.25	---
16:08	F	F-3	5.25	1.25	6.5	Metal rod and steel plate from 0606 sampling station visible 4-5 feet further into river
16:12	F	F-4	13.5	---	ND	No armor layer detected, geotextile fabric at 21.75 inches. However, 6 inches away, the armor layer was detected at 16 inches.
16:19	G	G-1	5.75	---	ND	In vicinity of 0607 sampling station (metal rod and steel plate visible). No armor layer detected, geotextile fabric at 10.5 inches.
	G	Armor-1	N/A	---	5.5	Armor layer was probed in vicinity of G-1 (Armor-1 through Armor-5). Based on variability of depth to armor layer, grid sampling was also conducted in vicinity of G-1 (BG-1 through BG-36).
	G	Armor-2	N/A	---	9.5	
	G	Armor-3	N/A	---	10	
	G	Armor-4	N/A	---	7.5	
	G	Armor-5	N/A	---	7.75	
16:25	G	G-2	7.5	4.5	12	---
16:28	G	G-3	13.5	2.75	16.25	---
16:31	H	H-1	N/A	---	10	Mostly sand overlying
16:33	H	H-2	N/A	---	4.25	Metal rod and steel plate from 0608 sampling station visible in immediate vicinity
16:45	G	BG Grid	Varies	Varies	Varies	See Table 3 BG Grid Measurement below.

N/A – Not Available; indicates when AECOM was unable to measure the sand layer as a distinct, separate layer from the overlying soft sediment.

ND – Not Detected; indicates the armor layer was not detected at the location.

The AG grid was measured at Transect E from 14:44 to 15:20. Depth to armor layer and depth to sand layer/thickness of sediment are summarized below:

Table 2: August 21, 2017 AG Grid Measurement

Location	Depth to Sand Layer/Thickness of Sediment (in)	Depth to Armor Layer (in)	Comment
AG-1	13.25	18	---
AG-2	14	18	---
AG-3	13.25	18.5	---
AG-4	14	16	---
AG-5	14	20	---
AG-6	14.5	17.5	---
AG-7	14	ND	New row (6 inches closer to shore), No armor layer detected, geotextile fabric at 21.5 inches
AG-8	15	ND	No armor layer detected, geotextile fabric at 24 inches
AG-9	14.5	18	---
AG-10	14	21	---
AG-11	13	19	---
AG-12	14	16	---
AG-13	14	ND	New row (6 inches closer to shore), No armor layer detected, geotextile fabric at 22 inches
AG-14	13.5	17	---
AG-15	13	17.5	---
AG-16	N/A	12.5	---
AG-17	13.5	ND	No armor layer detected, geotextile fabric at 22 inches

Location	Depth to Sand Layer/Thickness of Sediment (in)	Depth to Armor Layer (in)	Comment
AG-18	13	ND	No armor layer detected, geotextile fabric at 21.5 inches
AG-19	12.5	17	New row (6 inches closer to shore)
AG-20	12	ND	No armor layer detected, geotextile fabric at 21.5 inches
AG-21	13	16.75	---
AG-22	12.5	19	---
AG-23	12.5	19	---
AG-24	13	ND	No armor layer detected, geotextile fabric at 22 inches
AG-25	12	20	---
AG-26	13	18.5	---
AG-27	12.5	14.25	---
AG-28	12.5	ND	No armor layer detected, geotextile fabric at 21.5 inches
AG-29	13.5	18.75	---
AG-30	13	18.75	---
AG-31	11	17.75	New row (6 inches closer to shore)
AG-32	11.5	18	---
AG-33	12.25	ND	No armor layer detected, geotextile fabric at 21.5 inches
AG-34	12	16	---
AG-35	12.5	ND	Felt armor stones around probing rod, geotextile fabric at 22.5 inches
AG-36	11.5	19.75	---

N/A – Not Available; indicates when AECOM was unable to measure the sand layer as a distinct, separate layer from the overlying soft sediment.

ND – Not Detected; indicates the armor layer was not detected at the location.

Diagram 2: AG Grid Measurements (depth to armor layer in inches)

● 18	● 18	● 18.5	● 16	● 20	● 17.5
● 16	● 19	● 21	● 18	● ND	● ND
● ND	● 17	● 17.5	● 12.5	● ND	● ND
● ND	● 19	● 19	● 16.75	● ND	● 17
● 20	● 18.5	● 14.25	● ND	● 18.75	● 18.75
● 19.75	● ND	● 16	● ND	● 18	● 17.75

ND – Not Detected; indicates the armor layer was not detected at the location.

The BG grid was measured at Transect G from 16:45 to 17:08. Depth to armor layer and depth to sand layer/thickness of sediment are summarized below:

Table 3: August 21, 2017 BG Grid Measurement

Location	Depth to Sand Layer/Thickness of Sediment (in)	Depth to Armor Layer (in)	Comment
BG-1	5.5	10.25	---
BG-2	N/A	4.5	---
BG-3	4.5	8.5	---
BG-4	N/A	4.25	No sand detected
BG-5	4	5.5	---
BG-6	5	6.25	---
BG-7	3.75	13.25	New row (6 inches closer to shore)
BG-8	4.5	6.5	---
BG-9	5.25	10.25	---
BG-10	3.75	10.75	---

Location	Depth to Sand Layer/Thickness of Sediment (in)	Depth to Armor Layer (in)	Comment
BG-11	3.75	7	---
BG-12	4.5	7.5	---
BG-13	4.5	6.5	New row (6 inches closer to shore)
BG-14	3.5	ND	Felt armor stones around probing rod, geotextile fabric at 12 inches
BG-15	3.25	6	---
BG-16	4	10	---
BG-17	3.75	8.75	---
BG-18	3.5	7.5	---
BG-19	3.75	6.5	New row (6 inches closer to shore)
BG-20	4.25	8	---
BG-21	4	5.5	---
BG-22	3	11	---
BG-23	3.5	5	---
BG-24	5.25	6	---
BG-25	5.5	ND	New row (6 inches closer to shore), felt armor stones around probing rod, geotextile fabric at 12.5 inches
BG-26	3.25	8.75	---
BG-27	3.5	3.75	---
BG-28	3.5	7.5	---
BG-29	3	10	---
BG-30	3	6	---
BG-31	3	11.5	New row (6 inches closer to shore)
BG-32	3.5	9.5	---

Location	Depth to Sand Layer/Thickness of Sediment (in)	Depth to Armor Layer (in)	Comment
BG-33	3	11.25	---
BG-34	3.25	3.75	---
BG-35	3.5	5	---
BG-36	4	6.25	---

N/A – Not Available; indicates when AECOM was unable to measure the sand layer as a distinct, separate layer from the overlying soft sediment.

ND – Not Detected; indicates the armor layer was not detected at the location.

Diagram 3: BG Grid Measurements (depth to armor layer in inches)

● 10.25	● 4.5	● 8.5	● 4.25	● 5.5	● 6.25
● 7.5	● 7	● 10.75	● 10.25	● 6.5	● 13.25
● 6.5	● ND	● 6	● 10	● 8.75	● 7.5
● 6	● 5	● 11	● 5.5	● 8	● 6.5
● ND	● 8.75	● 3.75	● 7.5	● 10	● 6
● 6.25	● 5	● 3.75	● 11.25	● 9.5	● 11.5

ND – Not Detected; indicates the armor layer was not detected at the location.

Summary of August 22, 2017 Field Activities

Personnel in Attendance

Yeqing Liu – CDM Smith

Claire Murphy-Higgin – AECOM

Helen Jones – AECOM

The same 2-person AECOM team from the previous day conducted probing/poling along the channel side of transects A, B, C, D, E, F, G, H, and X from a motorized boat and in the same general manner as

the previous day. Transects that were not probed at all on the first day due to accessibility issues included Transects I, J, and Y. These transects were accessed by boat on this second day. Probing/poling was initially attempted with a 10-foot piece of PVC piping but AECOM indicated the PVC pipe could not pierce through overlying sediment/sand to get to the armor layer. Locations were then probed/poled with a 10-foot piece of steel rebar. Every six-inch interval on the steel rebar was marked with either blue or red tape which was able to measure depth to the nearest half foot. Precise measuring was done with a tape measure to the nearest 1/4th inch from the last half foot mark on the rebar. Depth to armor layer from water surface was measured at each location and the GPS coordinates of each location were also recorded. If the sand layer was detected, depth from the water surface to sand was also recorded. AECOM indicated they were able to feel sediment when probing/poling with the steel rebar. Mud was also observed on the rebar when it was brought to the surface. However, AECOM was unable to clearly differentiate the sediment layer from the water column during the actual act of probing/poling. Thus, depth from water surface to top of sediment could not be recorded. AECOM also noted difficulty in maintaining the same location when taking measurements and recording GPS coordinates due to river currents and wind. In some locations, the water was too high to measure depth to armor layer with the steel rebar (greater than 10 feet). These locations were returned to later in the day closer to low tide.

At each transect, at least one location was recorded just off the western edge of the cap and indicated as "off-cap". These locations were determined to be off-cap based on the GPS location in relation to the as-constructed cap maps and the lack of armor present during probing/poling. At each of the edge transects (X and Y) two or three off-cap and multiple on-cap locations were recorded to delineate the northern and southern edges of the cap. In one location along the B transect (B-5), the armor layer was not detected and the depth to fabric was recorded instead. To delineate the area of missing armor layer, three additional points were probed in the vicinity of B-5 that did detect the armor layer (B-12, B-13, and B-14). The grid process used the previous day to delineate areas of missing armor was not used due to difficulties in keeping the boat stationary and the lack of GPS precision at this scale.

At the end of probing/poling activities, AECOM recorded a 10-minute video of the cap and river from Transect X and ending at Transect Y from 15:52 to 16:02. This video was captured close to low tide.

Depth to armor layer and depth to sand layer (when recorded) are summarized below:

Table 4: August 22, 2017 Cap Inspection Summary

Time	Transect	Location	Depth to Sand Layer from Water Surface (in)	Thickness of Sand Layer (in)	Depth to Armor Layer (in)	Comment
11:59	J	J-1	N/A	---	ND	No armor layer detected, hardpan at 61 inches

Time	Transect	Location	Depth to Sand Layer from Water Surface (in)	Thickness of Sand Layer (in)	Depth to Armor Layer (in)	Comment
12:00	J	J-2	N/A	---	85.25	---
12:09	I	I-1	N/A	---	78.75	---
12:10	I	I-2	N/A	---	ND	No armor layer detected, hardpan at 46 inches
12:11	I	I-3	N/A	---	72	---
12:13	I	I-4	100.5	7	107.5	---
12:17	H	H-3	N/A	---	79	---
12:20	H	H-4	N/A	---	108	---
12:24	G	G-4	N/A	---	95	Northern edge of cap
12:27	G	G-5	N/A	---	115.5	---
12:29	G	G-6	82	6.75	88.75	---
12:34	F	F-5	49.5	5	54.5	---
12:36	F	F-6	73.75	3.25	77	---
12:39	F	F-7	N/A	---	114	---
12:47	E	E-4	68	4.5	72.5	---
12:49	D	D-4	N/A	---	82	---
12:54	D	D-5	102	10	112	---
12:58	C	C-5	N/A	---	80.25	---
13:00	C	C-6	N/A	---	50.5	---
13:05	B	B-4	66	4.5	70.5	---
13:09	A	A-4	54	4.5	58.50	---
13:10	A	A-5	93	15	108	---
13:17	A	A-6	87.75	12	99.75	---

Time	Transect	Location	Depth to Sand Layer from Water Surface (in)	Thickness of Sand Layer (in)	Depth to Armor Layer (in)	Comment
13:20	A	A-7	62.5	5.5	68	---
13:24	X	X-5	75.5	11.5	87	---
13:26	X	X-6	N/A	---	ND	No armor (off-cap)
13:27	X	X-7	86.5	5.75	92.25	---
13:32	X	X-8	N/A	---	ND	No armor (off-cap)
13:38	B	B-5	N/A	---	ND	No armor layer detected, geotextile fabric at 96 inches. However, armor layer was probed in vicinity of B-5 (B-12 to B-14)
13:42	B	B-6	N/A	---	86.25	---
13:43	B	B-7	93.75	7.25	101	---
13:45	B	B-8	101	11	112	---
13:46	B	B-9	N/A	---	ND	No armor (off-cap)
13:49	B	B-10	62.25	1.75	64	---
13:51	B	B-11	58	5.25	63.25	---
13:56	B	B-12	90	14	104	---
13:57	B	B-13	N/A	---	95	---
13:58	B	B-14	N/A	---	117.5	---
13:59	B	B-15	N/A	---	ND	No armor (off-cap)
14:05	X	X-9	N/A	---	ND	No armor (off-cap)
14:09	X	X-10	N/A	---	ND	No armor (off-cap)
14:11	X	X-11	N/A	---	81.5	---
14:15	X	X-12	N/A	---	88.5	---
14:20	A	A-8	N/A	---	108	---

Time	Transect	Location	Depth to Sand Layer from Water Surface (in)	Thickness of Sand Layer (in)	Depth to Armor Layer (in)	Comment
14:24	C	C-7	N/A	---	97.5	---
14:26	C	C-8	N/A	---	ND	No armor (off-cap)
14:29	C	C-9	62.25	8	70.25	---
14:33	D	D-6	N/A	---	ND	No armor (off-cap)
14:37	D	D-7	N/A	---	90	---
14:38	D	D-8	N/A	---	104.5	---
14:40	E	E-5	N/A	---	93	---
14:41	E	E-6	N/A	---	ND	No armor (off-cap)
14:44	E	E-7	64	7	71	---
14:48	F	F-8	N/A	---	ND	No armor (off-cap)
14:49	F	F-9	N/A	---	87.25	---
14:51	G	G-7	N/A	---	ND	No armor (off-cap)
14:54	G	G-8	37	2.5	39.5	---
14:58	H	H-5	N/A	---	ND	No armor (off-cap)
15:02	I	I-5	N/A	---	84	---
15:03	I	I-6	N/A	---	ND	No armor (off-cap)
15:07	J	J-3	N/A	---	ND	No armor (off-cap)
15:08	J	J-4	N/A	---	77	---
15:11	J	J-5	73.75	12.25	86	---
15:16	Y	Y-1	N/A	---	77.25	---
15:18	Y	Y-2	N/A	---	40	---
15:19	Y	Y-3	N/A	---	63.5	Northern edge of cap
15:20	Y	Y-4	N/A	---	ND	No armor (off-cap)

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Time	Transect	Location	Depth to Sand Layer from Water Surface (in)	Thickness of Sand Layer (in)	Depth to Armor Layer (in)	Comment
15:21	Y	Y-5	N/A	---	ND	No armor (off-cap)
15:24	Y	Y-6	55	9.5	64.5	---
15:26	Y	Y-7	96	1	97	---
15:38	A	A-9	N/A	---	66.5	Measurement was slightly off to the north of the A transect
15:41	A	A-10	N/A	---	103.5	---
15:44	A	A-11	N/A	---	ND	No armor (off-cap)

N/A – Not Available; indicates when AECOM was unable to measure the sand layer as a distinct, separate layer from the overlying soft sediment or water column.

ND – Not Detected; indicates the armor layer was not detected at the location.

Figure 1

Attachment 1

Photographs of Field Activities



Photograph 1: Fallen branches in vicinity of Transect E

8/21/2017



Photograph 2: Measuring depth to armor layer at E-3 near 0605 sampling station (Transect E)

8/21/2017



Photograph 3: Measuring grid point distances at AG grid at Transect E (AG-1 through AG-36)

8/21/2017



Photograph 4: Probing for southern edge of armor layer at Transect B

8/21/2017



Photograph 5: Recording GPS coordinates at X-3 (Transect X)

8/21/2017



Photograph 6: Recording GPS coordinates of Armor-1 in vicinity of G-1 (Transect G). Metal rod and steel plate marking the 0607 sampler station location also visible.

8/21/2017



Photograph 7: Measuring depth to armor layer at H-2 (Transect H) near sampling station 0608. Metal rod and steel plate marking the 0608 sampler station location also visible.

8/21/2017



Photograph 8: Drawing out grid BG near 0607 sampling station (Transect G)

8/21/2017



Photograph 9: Measuring depth to armor layer at BG-15 within the BG grid (Transect G)

8/21/2017



Photograph 10: Initial attempt to measure depth to armor layer with PVC pipe at I-4 (Transect I)

8/22/2017



Photograph 11: Measuring depth to armor layer from water surface at G-6 (Transect G)

8/22/2017



Photograph 12: Counting half foot markers on steel rebar to determine depth to armor layer from water surface at G-6 (Transect G)

8/22/2017

Attachment 2

Field Logbook Notes

32 Location Lyndhurst, NJ/Passaic Date 8/21/16
Project / Client USEPA - USACE / Passaic RM 10.9
S P M E Retrieval

1435 - installation tool. Last sampling
(cont) rod. All fibers intact. Fiber
lengths in mm are: 64.9,
103.4, 32.2, 11.8, 21.2,
68.2, 88.1, 99.6, 87.3,
82.5, 76.9, 81.8, 96.7,
74.0, 82.1, 88.6, 78.2, 83.6,
70.4, 66.5.

1500 Y. Lin leaves site

end of day

8/21/16

33 Location Lyndhurst, NJ/Passaic Date 8/21/17
Project / Client USEPA - USACE / Passaic RM 10.9
CAD Inspection

1302 Yeging Lin arrives onsite
(note taker)
Weather: Partly Cloudy, 87°F
Slight breeze
AECOM personnel already onsite
unloading from the car: Cleve
Murphy, Helen Jones
Will focus on "big foot"
cap inspection today. Looking to
be out at around 13:45
1355 AECOM heads out to transects
First Stop Transect C
14:05 C-1 edge of armor layer (0.5 inch
of soft sediment above) soft sediment
14:06 C-2 2.5 inches to armor or sand
sandy silt (indistinct layer detected)
14:08 C-3 7 inches soft sediment
10.5 inches from surface to armor
layer (can distinguish sediment/
sand layers overlying)
14:11 C-4 (sampling station) 13 inches
soft sediment 21.5 inches to armor
14:17 Probing for edge of armor layer
at Transect D from hard pan

Kit on the River

Location Lyndhurst, NJ / Passaic Date 8/21/17
Project / Client USEPA - USAEC / Passaic RM109
Cap Inspection

14:20 D-1 10 inches to armor layer
from surface

14:22 D-2 13 $\frac{1}{4}$ " to Sand. 16.5 in
to armor layer

14:24 D-3 about 3-4 feet closer
to shore from station 14.25 inches
to armor

14:32 E-1 probing edge of armor layer
3 inches to armor layer

14:35 E-2 1 ft to Sand, 18.5 inches
to armor

14:38 E-3 (sample station) 11 $\frac{3}{4}$ " to sand
22 inches to armor (lot of
variability in depth) → will do
grid layout sampling (6
points)

14:40 ~~AB~~ G-1 B. $\frac{1}{4}$ to Sand, 18" to armor

14:41 ~~AB~~ G-2 14" to sand, 18" to armor

14:42 ~~AB~~ G-3 B. $\frac{1}{4}$ to Sand, 18.5 to armor

14:44 ~~AB~~ G-4 14 to sand, 16 to armor

14:49 ~~AB~~ G-5 14 to sand; 20 to armor

14:50 ~~AB~~ G-6 14.5 to sand, 17.5 to armor

14:53 ~~AB~~ G-7 (starting 6 inches closer
to shore) 14 to sand, potentially poked
through fabric at this location

35

Location Lyndhurst, NJ/Passaic Date 8/21/17
Project / Client USEPA-USACE/Passaic RMID9
Cap Inspection

geotextile fabric at 21.5 inches, no armor detected \rightarrow moving 6 inches laterally

14:57 EG-8 - 15 in to sand, 24 inches to fabric

14:58 EG-9 - 14.5 in to sand, armor detected at 18 inches

14:59 EG-10 - 14 inch to sand, 21 inches to armor

15:00 EG-11 13 inches to sand, 19 inches to armor

15:01 EG-12 14 in to sand, 16 in to armor

All ^{above} grid locations were also GPSed prior to sampling (however, ~~the~~ ELOH determined it was not necessary)

15:02 EG-13 14 inches to sand, fabric to 22 inches (no armor)

15:03 EG-14 13.5" to sand, 17" to armor

15:04 EG-15 13" to sand, 17.5" to armor

15:05 EG-16 Armor at 12.5" (no sand detected above)

15:06 EG-17 13.5" to sand, fabric at 22"

15:07 EG-18 13" to sand, fabric at 21.25"

New row 8 inches closer to shore

15:08 EG-19 12.5 to sand, 17" to armor

15:09 EG-20 12 to sand, 21.5 to fabric

36 Location Lyndhurst, NJ / Passaic Date 8/21/17
 Project / Client USEPA - USACE / Passaic RM 10.9
 Cap Inspection

15:10 A EG-21, 13" to sand, 16.75" to armor
 15:11 A EG-22, 12.5 to sand, 19" to armor
 15:12 A EG-23, 12.5 to sand, 19" to armor
 15:13 New row 6 inches closer to shore
 A EG-25, 12 to sand, 20 to armor
 A EG-26, 13 to sand, 18.5 to armor
 A EG-27, 12.5 to sand, 14.25 to armor
 A EG-28, 12.5 to sand, 21.5 to fabric
 A EG-29, 13.5 to sand, 18.75 to armor
 A EG-30, 13 to sand, 18.75 to armor
 New row 6 inches closer to shore
 15:16 A EG-31, 11 to sand, 17.75 to armor
 A EG-32, 11.5 to sand, 18 to armor
 A EG-33, 12.25 to sand, 21.5 to fabric
 A EG-34, 12 to sand, 16 to armor
 A EG-35, 12.5 to sand, 23.5 to fabric
 (can feel armor close by)
 15:20 Probing for edge of armor layer
 at B-1 11 to sand, 14.75 to armor
 15:29 B-2 10 inches to sand 12 inches to armor. Disc observed from left sampling event

37 Location Lyndhurst, NJ / Passaic Date 8/21/17
 Project / Client USEPA - USACE / Passaic RM 10.9
 Cap Inspection

Grid of cap probing at Transect E

AG-1	AG-2	AG-3	4	5	6	Point E-3
10	11	10	9	8	7	
13	14	15	16	17	18	1/2 8/21/17
19	20	21	22	23	24	19
24	25	26	27	28	29	30
25	26	27	28	29	30	31
30	31	32	33	34	35	36
37	38	39	40	41	42	43

15:35 B-3 17.5 to sand, 20.5 to armor
 15:39 A1 7.5 to sand, 13.5 in to armor
 15:40 A2 6.25 to sand, 6.75 in to armor
 15:42 A-3 (station) 9 to sand, 10.5 to armor layer
 15:45 X-1 Armor at 5.3/4"
 15:47 X-2 no armor (off the cap)
 15:48 X-3 armor at 9 inch

Rite in the Rain

38 Location Lyndhurst, NJ / Passaic Date 8/21/17
 Project / Client USEPA / USACE / Passaic RMD9
 Cap Inspection

15:49 X-4 14.25 to armor (sand detected but not measurable)
 16:00 F-1 probing for edge of armor layer: 2.25 to sand, 18 inches to fabric. Armor all around fabric ^{1/2} apparently ^{within} 6 inches away. ~~Probe~~ ^{8/21/17} probing in vicinity of fabric headnot armor encountered at 1 in below surface (fabric measured likely between armor)
 16:06 F-2 4 inches to ^{1/2} sand, 7.25 to armor
 16:08 F-3 (disk is visible 4-5 feet into river, 5.25 to sand 6.5 to armor from F-3)
 16:12 F-4 19.5 to sand, 20.75 to fabric 6 inches away, armor at 16 inches
 16:19 G-1 5.75 to sand, 10.5 to fabric - will probe for extent of armor (layer) 14 inches away, 5.5 inches below surface armor detected (Armor-1) 9.5 inches armor detected (Armor-2) 10 inches (Armor-3). Armor 9-7.5 inches, Armor -5 7.75 inches. All armor locations were GPSed & probed around location of missing armor

Location Lyndhurst, NJ / Passaic Date 8/21/17 39
 Project / Client USEPA / USACE / Passaic KM10.9
 Cap Inspection

16:25 G-2 7.5 to sand, 12 inches to armor
 16:28 G-3 13.5 to sand, 16.25 to armor
 16:31 H-1 10 in to armor (mostly sand)
 16:33 H-2 4.25 in to armor (disk visible at this location)
 16:45 Grid created BG near D607 extending location 3ft by 3ft grid.
 BG-1 5.5 sand, 10.25 armor
 BG-2 4.5 sand, 4.5 armor
 BG-3 4.5 sand, 8.5 armor
 BG-4 4.25 armor (no sand)
 BG-5 4 in to sand, 5.5 armor
 BG-6 5 in sand, 6.25 armor
 new row 6 inches closer to shore
 16:50 BG-7 3.75 to sand, 13.25 in to armor
 BG-8 4.5 to sand, 6.5 armor
 BG-9 5.25 to sand, 10.25 armor
 BG-10 3.75 sand, 10.75 armor
 BG-11 3.75 sand, 7" armor
 BG-12 4.5 sand, 7.5" armor
 16:56 new row 6 inches closer to shore

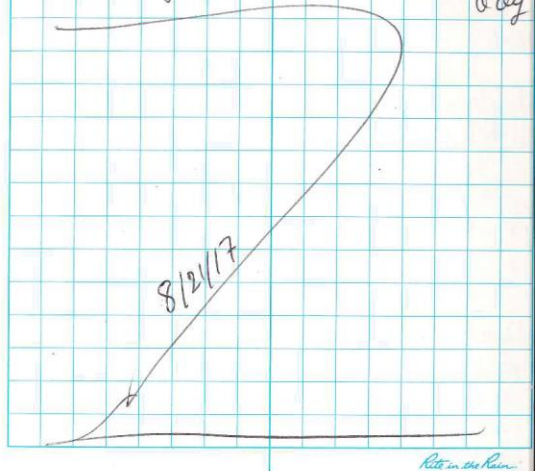
Rite in the Rain

Location Lyndhurst, NJ / Passaic Date 8/21/17
 Project / Client USEPA - USACE / Passaic RM10.9
 Cap Inspection

BG-13 4.5 sand, 6.5 armor
 BG-14 3.5 sand, fabric felt (between armor & shore rocks (12 inches below surface)
 BG-15 3.25 sand, 6 inches of armor
 BG-16 4 in sand, 10 in to armor
 BG-17 3.75 sand, 8.75 armor
 BG-18 3.5 sand, 7.5 armor
 16:59 New row (6 in chs forward)
 BG-19 3.75 to sand, 6.5 to armor
 BG-20 4.25 to sand, 8 to armor
 BG-21 4 in to sand, 5.5 to armor
 BG-22 3 in to sand, 11 to armor
 BG-23 3.5 to sand, 5 in to armor
 BG-24 5.25 sand, 6 in to armor
 New row 6 in closer to shore
 17:03 BG-25 5.5 sand, 10.5 armor
 hitting fabric at 12.5 in
 BG-26 3.25 sand, 8.75 armor
 BG-27 3.5 sand, 3.75 armor
 BG-28 3.5 sand, 7.5 armor
 BG-29 3 in sand, 10 in to armor
 BG-30 3 in sand, 6 in to armor
 17:06 New row
 BG-31 3 in sand, 11.5 armor

Location Lyndhurst, NJ / Passaic Date 8/21/17
 Project / Client USEPA - USACE / Passaic RM10.9
 Cap Inspection

BG-32 3.5 in sand, 9.5 armor
 BG-33 3 in sand, 11.25 in to armor
 BG-34 3.25 sand, 3.75 armor
 BG-35 3.5 sand, 5 in armor
 BG-36 4 in sand, 6.25 armor
 1700 - Probing complete, rest will be conducted by Galt
 11 AM start date for Tuesday
 1754 AECOM leaves site.
 1755 Yeging Lin leaves site. End of day



Location Lyndhurst, NJ/Passaic Date 8/22/17
 Project / Client USEPA/USACE/Passaic RM10.9
 Cap Inspection

- 11:05 Yegorov arrives onsite AECOM is already onsite unloading the boat from truck.
 Weather Partly cloudy, 80°F, Light Breeze
 AECOM personnel Clare Murphy, Helen Jones
- 11:30 Loading boat into the water
- 11:52 Boat moving along water
- 11:54 Testing edge of cap at 0607, water is too high for measurement rod, cannot measure depth to armor layer here yet.
- 11:56 Same at edge of 0608 water too high
- 11:59 Boat arrives at 0600 (Transsect J)
 J-1: 5'1" to hard pan, J-2 7'1.25" to armor (J-2 a little north of J-1)
- 12:04 J-3 attempted measurement but armor layer is too deep for measuring rod (over 10 ft)
- 12:09 I-1 6'6.75" to armor
- 12:10 (moving closer to shore to I-2) 3 ft 10 inches to hard pan
- 12:11 I-3 6 ft to armor
- 12:13 I-4 8 ft 4.5 inches but into sand, can't

Location Lyndhurst, NJ/Passaic Date 8/22/17 43
 Project / Client USEPA/USACE/Passaic RM10.9
 Cap Inspection

- get through to armor. Will switch to steel rebar to measure with.
- 12:18 ~~4~~ 8 ft 11.5 inches to armor
- 12:20 ~~5~~ 6 ft 7 inches to armor H-3
~~7~~ 5.9 ft to armor H-4
 VL 8/22/17
- 12:24 G-4 (edge of cap) 7 ft 11 inches to armor
- No measurement for sediment thick because it is difficult to tell the layer apart from water dredging
- 12:27 G-5 Top of sand at 9 ft 7.5 inches
- 12:29 G-6 6 ft 10 inches to top of sand
 7 ft 4.75 inches to top of armor
- 12:34 F-5 4 ft 6.5 inches to armor, 4 ft 1.5 inches to sand
- 12:36 F6 6 ft 5 inches to armor, 6 ft 1.75 inches to sand
- 12:39 F-7 9.5 ft to armor, moving onto next station VL 8/22/17 Transsect (E)
- 12:42 E-4 attempted but boat was moving too much due to current and wind
- 12:47 E-4 2nd attempt: 6 ft 0.5 inch to armor 5 ft 8 inches to sand

Not in the Rain

44 Location Lyndhurst, NJ/Passaic Date 8/22/17
 Project / Client USEPA / WJACE Passaic River RM10.9
 Cap Inspection

1249 D-9 6 ft 10 inches to armor,
 1254 D-5 8.5 ft to sand, armor at
~~1254~~ 9 ft 4 inches
 moving onto transect C
 1258 C-5 6 ft 8.25 inch to armor
 1300 C-6 4 ft 2.5" to armor, water is
 1302 Attempted point but too deep
 Moving onto Transect B/0602
 1305 B-4 5.5 ft to sand, 5'10" to armor
 1306 D-5 attempted location further
 is when but water was too deep
 Moving onto Transect A/0601
 1309 A-4 sand at 4.5', armor at 4'10"
 1310 A-5 9 ft to armor, 7 ft 9 inches to
 sand layer
 1317 A-6 7'3.75" to sand, 8'3.75" to
 armor
 1320 A-7 5'2.5" to sand, 5'8" to
 armor
 Moving to southern edge of cap
 (Transect X)
 1324 X-5 7'3" to armor, 6'3.5" to
 sand
 1326 X-6 off cap measurement (further
 south) confirmed

45 Location Lyndhurst, NJ/Passaic Date 8/22/17
 Project / Client USEPA / WJACE Passaic RM10.9
 Cap Inspection

1327 X-7 7'2.5" to sand, 7' ~~8.25"~~
 to armor
 1332 X-8 off cap point ^{yes 8/22/17}
 1334 Break in the shade ~~observed~~
 fallen branches near shore around
 Transect A (see photo)
 1338 Probing at edge of cap at 0602
 Transect B
 B-5 missing armor layer,
 fabric detected at 8 ft, no
 sand measurement but felt
 will try to delineated area of
 missing armor layer
 B-6 armor detected 7'2.25" to
 armor
 1342 B-7 7'9.75" to sand 8'5" ft to
 armor
 1343 B-8 8.5' to sand, 9'4" to
 armor
 1346 D-9 off cap
 1349 5'4" to armor 5'2.25" to
 sand - B-10
 1351 B-11 4'10" to sand 5'3.25" to
 armor

Rite in the Rain

46 Location Lyndhurst, NJ / Passaic Date 8/22/17
 Project / Client USEPA USACE Passaic RM10.9
 Cap Inspection

1354 Getting back to area of spotty armor at edge of cap (around B-5 measurement) to further delineate
 1356 B-12 7.5' to said 8' 8" to armor
 1357 B-13 7' 11" to armor
 1358 B-14 9' 9.5" to armor
 1359 B-15 off cap point
 (Moving southward to delineate southern extent of spotty area)
 Attempted measurement but too deep
 Moving to traced X ~~instead~~ ^{instead}
 1405 X-9 is off cap
 1408 ~~X-10~~ ^{Y-10} 8/22/17 the location is too deep for a measurement (water is too deep)
 1409 X-10 is off cap
 1411 X-11 6' 9.5" to armor
 1415 X-12 7' 4.5" to armor
 1420 A-8 9' to armor
 Moving to transect C
 1424 C-7 8' 1.5" to armor
 1426 C-8 off cap
 1429 Going closer to shore along C transect: C-9 5' 10.25" to armor

47 Location Lyndhurst, NJ / Passaic Date 8/22/17
 Project / Client USEPA USACE Passaic RM10.9
 Cap Inspection

1437 5' 2.25" to said Cat (C-9)
 Moving to Transect D
 1433 D-6 off cap
 1437 D-7 7.5' to armor
 1438 D-8 8' 8.5" to armor
 Moving to transect
 1440 E-5 7' 9" to armor
 1441 E-6 off cap
 Moving closer to shore to get point in between E-5 and E-6
 1444 E-7 5' 4" to said 5' 11" to armor
 Moving to F transect
 1448 F-8 off cap (way)
 1449 F-9 3.25' to armor
 Moving to G transect
 1451 G-7 off cap
 Moving inward to shore to fill gap in measurements
 1454 G-8 (slightly to the south of transect) 3' 1" to said 3' 3.5" to armor
 Moving to transect H
 1458 H-5 is off cap
 Moving to transect J
 1502 J-5 armor at 7' Moving out for

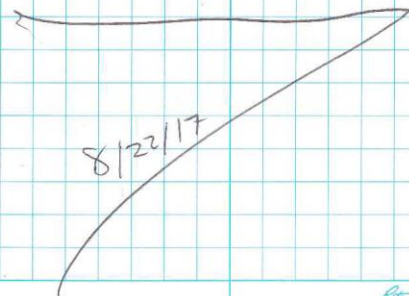
Rite in the Rain

Location Lyndhurst, NJ/Passaic Date 8/22/17
 Project / Client USEPA/USACE Passaic RM10.9
Cap Inspection

- off cap measurement
 1503 I-6 off cap
 Moving to transect J
 ✓ J-3 second attempt (different location) off cap
 1507 J-4 (further inland) 6'5" to armor
 1511 J-5 (a little further into river, away from shore) armor 7'2", 6'1.75" to sand
 Moving to Y transect
 1516 Y transect attempted measurement (too deep) YL 8/22/17
 Y-1 6'5.25" inch ~~to~~ armor
 1518 Y-2 3'4" to armor (close to shore)
 1519 Y-3 5'3.5" to armor (further from shore) edge of cap
 1520 Y-4 off cap (a little north)
 1521 Y-5 off cap YL 8/22/17
 1524 Y-6 further inland: 8.5 ft to armor 9'7" 5'4.5" armor
 1526 Y-7 8' to sand 8'1" to armor
 Moving back to transect A to collect off cap sample

Location Lyndhurst, NJ/Passaic Date 8/22/17
 Project / Client USEPA/WACE Passaic RM10.9
Cap Inspection
YL 8/22/17

- 1538 ~~1533~~ A-9 armor at 5'6.5" (off the transect to the north)
 1541 A-10 armor at 8'7.5"
 1544 A-11 off cap
 Done with poking by boat
 1552 Starting at transect X (edge of cap) & APCOM is filming entirety of cap by boat starting at transect X & ending at transect Y
 1602 Finished filming returning to shore
 1710 Y Lin leaves site. APCOM is still decoming & loading boat back to rental agency vehicle
 END OF DAY



Return to the River